



New Argonne Technologies Help in the Transition to Hydrogen-Fueled Vehicles

We have 175,000 gasoline service stations in the U.S. and virtually no hydrogen-refueling infrastructure. So how can we make the transition to hydrogen-fueled vehicles? Researchers at Argonne National Laboratory are working to answer that question as they develop onboard fuel cell technologies that help convert today's readily available hydrocarbon fuels into environmentally friendly, hydrogen-driven electrical power for vehicles. One of the most promising of the "green" fuel cell technologies for transportation applications is the polymer electrolyte membrane (PEM) fuel cell. In a typical configuration, a PEM fuel cell relies on a fuel processor to take a commonly available hydrocarbon fuel (such as gasoline, natural gas, liquefied petroleum gas, or diesel fuel) from an onboard fuel tank and convert the fuel into the hydrogen gas required to operate the PEM fuel cell that powers the vehicle.

An Argonne-developed and patented gasoline-to-hydrogen catalyst for PEM fuel cell fuel processors was recently recognized by *R&D Magazine* as one of the 100 most technologically significant new products of 2001. The catalyst itself has already been licensed to Süd-Chemie Inc. for manufacture and distribution. The Argonne-designed catalyst is the key component of a unique fuel processor that takes a mixture of fuel (such as gasoline), air, and water and converts it at 700°C into a hydrogen-rich stream that also contains some byproduct carbon monoxide and carbon dioxide, as well as traces of sulfur. The fuel processor then converts the carbon monoxide into carbon dioxide and additional hydrogen, while trapping the sulfur inside a replaceable cartridge. The hydrogen – with some carbon dioxide – is then sent on to power the PEM fuel cell that makes electricity for the electric motor that drives the wheels.

Argonne's fuel processor for fuel cells may pave the way for an eventual transition to widespread use of hydrogen in fuel cell vehicles, reducing our nation's dependence on imported oil while simultaneously reducing vehicle emissions.

For more information, contact James Miller, Chemical Technology Division, Argonne National Laboratory, 9700 S. Cass Avenue, Building 205, Argonne, Illinois 60439. Phone: 630-252-4537, fax: 630-972-4537, millerj@cmt.anl.gov. Funding for the catalyst and fuel processor research was provided by the U.S. Department of Energy's Office of Transportation Technologies, which is a part of DOE's Energy Efficiency and Renewable Energy sector.

